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ABSTRACT

A study investigated third graders' use of oral retellings in solving mathematics word problems. Research examined the extent to which third-grade students, following instruction and experience with oral retellings, selected and used this strategy in solving word problems when they were not required to do so. The nature of third graders' oral retellings of mathematics word problems was also explored. Researchers designed a 15-lesson instructional sequence to help students learn to solve word problems, with instruction and guided practice in oral retellings embedded within the lessons. Prior to implementation of the sequence, 10 students were interviewed individually to assess their strategies for solving multiplication and division word problems. Following the interviews, the lessons were taught intermittently over a 4-month period, based on the teacher's schedule, with a range of 0 to 2 lessons weekly. During lessons, students were videotaped, their work samples collected, and field notes were taken. After the lesson sequence, they were again interviewed. Preliminary analysis revealed that complete oral retellings of word problems appeared to be a challenge for this third-grade group to learn and use; retelling all the major elements of a word problem did not become a strategy of choice. Oral retellings were very basic at the beginning; with experience, students were able to relate more details, but only after extensive instruction and practice in storytelling. Students frequently used their own retelling methods, which researchers characterized as rudimentary, or partial, oral retellings. Includes 15 word problems. (NKA)

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# Examination of Oral Retellings of Word Problems by Third Grade Students.

By Eula Ewing Monroe, Sharon Black, and Amanda J. Buhler

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**Examination of Oral Retellings of Word Problems by Third Grade Students**

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The role of language in learning is a topic of research in a variety of curriculum areas. In discussing the importance of language in learning mathematics, LeBlanc and Weber-Russell (1996) note the importance of linguistic issues in children's understanding of problems. Fuson, Caroll, and Landis (1996) discuss the blend of linguistic skills and practical knowledge involved in solving word problems. Countryman (1992) offers a functional explanation: Words are instruments that facilitate thought. But word problems can be difficult for children to comprehend because the language of word problems is different from the language they use in describing their own problems and experiences (e.g., Kliman & Richards, 1992).

Oral retelling has long been recognized as a strategy for improving children's reading comprehension (e.g., Gambrell, Kapinus, & Koskinen, 1991); but few studies have addressed oral retellings in mathematics. The purpose of this study was to investigate third graders' use of oral retellings in

solving mathematics word problems. Research was guided by the following questions:

1. Following instruction and experience with oral retellings, to what extent do third grade students select and use this strategy in solving word problems when they are not required to do so?

2. What is the nature of third graders' oral retellings of mathematics word problems?

## Method

In collaboration with a third grade teacher, the researchers designed a 15-lesson instructional sequence to help students learn to solve word problems, with instruction and guided practice in oral retellings embedded within the lessons. Prior to implementation of the lesson sequence, 10 students from this teacher's classroom were interviewed individually to assess their strategies for solving multiplication and division word problems. Following the interviews, the lessons were taught intermittently over a 4-month period, based on the teacher's schedule, with a range of zero to two lessons per week. Most lessons lasted approximately 30 minutes. During lessons, the students under study were videotaped, their work samples were

collected, and field notes were taken. Upon completion of this lesson sequence, these students were again interviewed individually to ascertain their strategies for solving multiplication and division word problems. All interviews were audiotaped and videotaped, and a trained observer took field notes. The recorded discourse, field notes, and student work samples are under study at this time.

## Description of Lessons

The lessons were designed to introduce one multiplication/division word problem per day as the focus for oral retelling. The word problems were ordered roughly by increasing difficulty according to problem type and number difficulty (Carpenter, Fennema, Franke, Levi, & Empson, 1999) throughout the series of 15 lessons. These word problems were selected by the classroom teacher from a bank of problems developed by the researchers. Each problem included three sets of numbers from which the students were guided to choose a set of numbers that would be challenging but workable for developing problem solution strategies. Although an overall plan for content coverage was in place, modifications were made on a day-by-day basis as the students encountered success or difficulties with oral retellings and solution strategies. As the researchers spent more time in

the classroom, they were able to develop word problems using names and contexts that were increasingly familiar to the students.

After the initial session, during which the goals and procedures for the project were introduced, the lessons consisted of the following components:

- Class review of oral retelling strategies used during previous lessons.
- Presentation of the word problem for the day by the teacher or the lead researcher. (The presentation varied, but frequently the discussion involved the students in predicting problem content and modeling oral retelling.)
- Oral retelling of the word problem in dyads.
- Independent problem solving, with the directions to attempt to employ two different strategies.
- Sharing of solutions by two or three students, with work shown on transparencies.
- Review of the oral retelling and problem solving strategies used in the lesson.

## Preliminary Findings

Analysis of the lessons revealed that complete oral retellings of word problems appeared to be a challenge for this group of third graders to learn and use; retelling all the major elements of a word problem did not become a strategy of choice. Oral retellings were very basic at the beginning of the project, ranging from attempts to repeat the problem word for word to retelling only the numbers and perhaps the context: e.g., "This problem is about 5 apples." With experience, students were able to relate more details, but only after extensive instruction and practice in retelling. After multiple experiences with predicting from the first sentence of the word problem, students improved their ability to focus on and relate essential details.

Rather than retelling the entire word problem to a partner as originally requested, students frequently chose to retell the problem with a partner. Some students consistently chose not to attempt to retell the problem. Collaborative retelling appeared to be a successful strategy for students who chose to use it, as was collaborative problem solving.

Analysis of the pre- and post-interviews revealed an interesting and important phenomenon that the researchers had not anticipated: Students appeared to have their own methods of retelling that were easier and more natural for them than were complete oral retellings. They used what the

researchers have characterized as rudimentary, or partial, oral retellings. They used these partial oral retellings spontaneously but on a limited basis before instruction in retelling and more frequently after the series of lessons. In the post-interviews they used complete oral retellings only when prompted; however, they appeared to use partial oral retellings when the problem posed some difficulty for them. In most instances, they were successful in solving the problem for which they employed partial oral retelling. After instruction in solving word problems using oral retellings, the students interviewed generally were successful in solving a broader range of word problems using more difficult numbers than in the pre-interviews.

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**Interview Problems by Problem Type**

**1. Grouping/Partitioning (Multiplication)**

Robert and his parents made (4, 7, 15) bags of cookies for their neighbors. They put (5, 6, 8) cookies in each bag. In all, how many cookies did they make?

**2. Grouping/Partitioning (Measurement Division)**

Mindy bought a bag of caramel candy. She decided to give (3, 8, 12) caramels to each of her friends. All together Mindy has (12, 32, 48) caramels. How many friends received caramels?

**3. Grouping/Partitioning (Partitive Division)**

There are (5, 9, 12) children who are using crayons to color their pictures. Each child has the same number of crayons. All together there are (25, 36, 60) crayons. How many crayons does each child have?

**4. Rate (Multiplication)**

John's mother walks (3, 5, 7) miles every morning. How many miles does she walk in (6, 7, 12) mornings?

**5. Rate (Measurement Division)**

Karen's sister hikes (3, 6, 12) miles each Saturday. How many Saturdays will it take her to hike (15, 36, 96) miles?

**6. Rate (Partitive Division)**

Mark's father worked on (15, 28, 72) cars in his repair shop. He worked on the same number of cars each day. If he worked for (5, 7, 9) days, how many cars did he work on each day?

**7. Price (Multiplication)**

A kite costs ($5, $7, $11). How much money would you need to buy (6, 7, 9) kites?

**8. Price (Measurement Division)**

Jose's mother found shirts on sale. Each shirt costs ($4, $6, $12) each. How many shirts could she buy for ($24, $42, $36)?

**9. Price (Partitive Division)**

Becky bought (3 6, 11) pizzas for a party. She spent a total of ($12, $36, $44). If each pizza cost the same amount, how much did one pizza cost?

**10. Multiplicative Comparison (Multiplication)**

The tree in the park is (3, **6,** 7) times as tall as the slide. The slide is (6, 7, 12) feet tall. How tall is the tree?

**11. Multiplicative comparison (Measurement Division)**

The flag pole is (24, 35, 48) feet tall. A person standing next to the flag pole is (4, 5, 6) feet tall. The flag pole is how many times as tall as the person?

**12. Multiplicative Comparison (Partitive Division)**

The mother giraffe is (18) feet tall. She is (3) times as tall as her baby. How tall is her baby?

The tree is (18, 21, 45) feet tall. It is (6, 7, 9) times as tall as the small tree beside it. How tall is the small tree?

**13. Array**

Lynette's family planted flowers in their flower garden. They planted (3, 6, 7) rows of flowers with (4, 7, 14) flowers in each row. How many flowers did they plant?

**14. Area**

Ryan's mother is building a tree house. The floor of the tree house is in the shape of a rectangle. Its length is (7, 9, 13) feet and its width is (5, 8, 8) feet. How many square feet is the tree house floor?

**15. Combination**

Jenny has (3, 4) shirts and (4, 5) pairs of pants. How many different outfits does Jenny have?

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